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| 10/731,760 | 12/09/2003 | Kimberly Chotkowski | I-2-0504.1US | 6926 |
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| VOLPE AND KOENIG, P.C. DEPT. ICC UNITED PLAZA, SUITE 1600 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103 | | | DESIR, PIERRE LOUIS | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/731,760 | Applicant(s) CHOTKOWSKI ET AL. | |
| | Examiner Pierre-Louis Desir | Art Unit 2617 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/09/2006 has been entered.

Response to Arguments

2. Applicant's arguments filed 01/13/2006 have been fully considered but they are not persuasive.

Applicants argue, as related to claims 33-36, that the two antennas of Etkin are not communicating with each other nor are they coordinating their beams so that the degree of alignment between the beams is above a predetermined level for a predetermined length of time.

Examiner respectfully disagrees with applicants. In paragraph 47, Etkin discloses that Base station 12 is configured to perform time-varying beamforming operations through the use of one or more antenna arrays in conjunction with an FPM scheme or a similar scheme. "Beamforming" is used herein to refer to the forming of a directional antenna gain pattern for the forward link of a base station. In one embodiment, an antenna array consisting of two antenna elements is utilized. Therefore, two (separate) antennas elements, which are part of the base station (see fig. 1) (thus communicating with each other via not directly but through the base station), coordinate their beams. Etkin also discloses that a first one of these antennas transmits a

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signal with a constant amplitude gain and phase, while the other of the antennas transmits the same signal, but at a possibly lower amplitude gain and with a time-varying phase shift relative to the first antenna. The two signals interfere with each other, constructively in some regions and destructively in others, resulting in a modified time-varying antenna gain pattern, which is possibly narrower and more directional than either of the two individual antenna gain pattern (paragraphs 44, 47, and 49).

Applicant further discloses that Etkin does not disclose a method of coordinating beam forming between communicating entities.

Examiner respectfully disagrees with applicants. Etkin discloses that Base station 12 is configured to perform time-varying beamforming operations through the use of one or more antenna arrays (i.e., two antennas or communication entities). In addition, the recitation is in the preamble. Applicants are reminded that **a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).**

Applicant argues that neither Etkin nor Guo alone or in combination teach or disclose that the two communicating entities are physically separate from each other.

Examiner respectfully disagrees. Etkin discloses in fig. 1, that the two antennas, although part of the base station, are physically separate from each other.

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

The claim has been amended. The limitation, "determining a correction factor based on the measured error", requires new ground of rejection.

Further, Applicants' arguments about subject matter that are recited in the preamble are moot since they are not given any patentable weight.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-36 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of copending Application No.

10/845829, and over claims 1-35 of copending application No. 10/730671. Although the

conflicting claims are not identical, they are not patentably distinct from each other because, for

example, claim 1 of the present application discloses a method for coordinating the use of beam forming between two physically separate communicating entities wherein control information regarding the use of beam forming is not communicated between the two entities, whereas claim 1 of copending application Nos. 10/845829 and 10/730671 discloses a method for coordinating the use of beam forming between two communicating entities wherein control information regarding the use of beam forming is not communicated between the two entities. The Applications describe limitations that are not patentably distinct from each other

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

4. Claims 1, 6, 12, 19, 23, 27, and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims have been amended with the limitation, "physically separate." This limitation represents new matter.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 33-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Etkin et al. (Etkin), Pub. No US2004/0204108.

Regarding claim 33, Etkin discloses a method for coordinating the use of beam forming between two physically separate (see fig. 1) communicating entities, the method comprising the step of: reducing at least one adjustment parameter of a beam of at least one of two communicating entities communicating with each other using beamed formed transmission and reception signals wherein a degree of alignment between beams emanating from the two entities is above a predetermined level for a predetermined length of time (i.e., the base station will be able to provide good coverage to the whole sector. If the number of mobile stations is greater than or equal to $N_{sub.1}$, but less than a higher threshold $N_{sub.2}$, the fluctuation rate (denoted by "R") and the beam width (denoted by "W") are set to some pre-selected medium values, $R_{sub.1}$ and $W_{sub.1}$, respectively. Exemplary values for $R_{sub.1}$ may be 1 to 4 cycles per second. Exemplary values for $W_{sub.1}$ may be 45 to 60 degrees. If the number of mobile stations is greater than or equal to a higher threshold $N_{sub.2}$, the beam width is set to a small value $W_{sub.2}$, and the fluctuation rate is set to a high value $R_{sub.2}$. If $N_{sub.2}$ is set to a very large value, the base station will either turn off the FPM scheme (if the number of mobile stations is less than $N_{sub.1}$), or otherwise use some fixed values for the fluctuation rate and the beam width) (see fig. 1, page 4, paragraphs 44 and 47).

Regarding claim 34, Etkin discloses a method as described in claim 33 rejection, wherein the at least one adjustment parameter that is reduced is beam width (see page 3, paragraph 22).

Regarding claim 35, Etkin discloses a method as described in claim 33 rejection, wherein the at least one adjustment parameter that is reduced is power gain (see page 3, paragraph 22).

Regarding claim 36, Etkin discloses a method as described in claim 33 rejection, wherein the at least one adjustment parameter that is reduced is beam width and power gain (see page 3, paragraph 22).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 23-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etkin et al. (Etkin), Pub. No US2004/0204108 in view of Guo et al. (Guo), U.S. Patent No. 6894643.

Regarding claim 23, Etkin discloses a wireless communication system wherein beams may be adjusted to enhance wireless communications between physically separate (see fig. 1) wireless entities operating in the system (see fig.1, page 4, paragraph 46), the wireless communication system comprising: a plurality of wireless entities (see abstract), said entities being capable of communicating using beam formed transmission and reception patterns (see abstract and figs. 1-2, page 4, paragraphs, 46-47, page 5, paragraph 49); and wherein at least

one of two communicating wireless entities selects at least one adjustment parameter for adjusting its beam (see abstract, and page 2, paragraphs 14 and 21, page 4, paragraph 44).

Although Etkin discloses a system comprising a software application which may be embodied in a data processor, and may be configured to identify the number of mobile stations in the sector, determine whether beamforming is to be performed and the corresponding rate of rotation, generate control signals to provide the desired beamforming, if necessary (paragraph 77), Etkin does not specifically disclose a system comprising a processor for measuring an error in the alignment of their own beam and the beam of another entity with which they are communicating, and wherein the selection of at least one adjustment parameter for adjusting its beam a fraction of the error measured in the alignment of its beam with respect to the beam of the other wireless entity.

However, Guo discloses a system wherein the output signal $y(t)$ of the beam former 50 is compared with a reference signal $d(t)$ using a subtraction element 44, and the resulting difference signal $e(t)$, representing the difference between the actual output signal of the beam former and the reference signal, is applied to the tracking unit 52 which uses that error signal to adjust the weights applied to the multipliers (see col. 11, lines 61-67). Guo further discloses a processor programmed to perform the steps of: (i) performing an iterative adaption algorithm to produce iterative control information for adjusting the receiver beam pattern so as to facilitate reception of the transmission signal; (ii) producing an estimate of desired control information by combining the received signals with a replica of the predetermined data so as substantially to remove the effect of data modulation due to the predetermined data from the received signals;

and (iii) selecting as the control information input to the beam former either the iterative control information, or the estimate of the desired control information (see col. 7, lines 53-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both arts to arrive at the claimed invention. A motivation for doing so would have been to provide features related to good estimate of the optimum control information, which can be obtained from the relative phase delays between signals received by respective elements (col. 3, lines 8-12).

Regarding claim 24, Etkin discloses a wireless communication system as described in claim 23 rejection, wherein the processor of the at least one communicating wireless entity is configured to adjust the beam of the at least one wireless entity in an amount equal to the fraction multiplied by an error measured (i.e., a processor configured to determine whether beamforming is to be performed and the corresponding rate of rotation, generate control signals to provide the desired beamforming) (see paragraph 77).

Regarding claim 25, Etkin discloses a wireless communication system as described in claim 23 rejection, wherein the processor of the at least one communicating wireless entity is configured to select at least one adjustment parameter for performing said adjustment (see, and page 4, paragraphs 44, 47, and 77).

Regarding claim 26, Etkin discloses a wireless communication system as described in claim 25 rejection, wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 27, Etkin discloses a wireless communication system configured to maintain alignment of its beam with the beam of another physically separate wireless entity with which the WTRU is communicating (see fig. 1, paragraph 46).

Although Etkin discloses a system wherein a processor is configured to select an adjustment parameter for adjusting the beam (see paragraph 77), Etkin does not specifically disclose a system wherein the WTRU comprising: a first processor configured to measure an error in the alignment of a first beam emanating from the WTRU and a second beam emanating from the other wireless entity; and a second processor configured to compute a first fraction and adjust the first beam using the at least one selected parameter in an amount equal to the first fraction multiplied by the error measured.

However, Guo discloses a system comprising a processor programmed to perform the steps of: (i) performing an iterative adaption algorithm to produce iterative control information for adjusting the receiver beam pattern so as to facilitate reception of the transmission signal; (ii) producing an estimate of desired control information by combining the received signals with a replica of the predetermined data so as substantially to remove the effect of data modulation due to the predetermined data from the received signals; and (iii) selecting as the control information input to the beam former either the iterative control information, or the estimate of the desired control information (see col. 7, lines 53-65). It should also be noted that the beam former may be implemented in hardware, or as a software module running on the same or a different processor (col. 8, lines 43-45). And, through the processor, the output signal $y(t)$ of the beam former 50 is compared with a reference signal $d(t)$ using a subtraction element 44, and the resulting difference signal $e(t)$, representing the difference between the actual output signal of

the beam former and the reference signal, is applied to the tracking unit 52 which uses that error signal to adjust the weights applied to the multipliers (see col. 11, lines 61-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both arts to arrive at the claimed invention. A motivation for doing so would have been to provide features related to good estimate of the optimum control information, which can be obtained from the relative phase delays between signals received by respective elements (col. 3, lines 8-12).

Regarding claim 28, Etkin discloses a WTRU as described in claim 27 rejection, further comprising: a transmitter configured to transmit the fraction of the measured error that the WTRU will adjust its beam to the wireless entity with which the WTRU is communicating (see page 5, paragraph 49).

Regarding claim 29, Etkin discloses a WTRU, as disclosed in claim 28 rejection, further comprising: a receiver configured to receive, from the wireless entity with which the WTRU is communicating, a second fraction with which the entity used to adjust its beam (i.e. the base station transmits signals, each of the mobile stations within the sector receives the signal and computes a SINR (see page 3, paragraph 22, and page 5, paragraph 49).

Although Etkin discloses a WTRU as described above, Etkin fails to specifically disclose when a second fraction is received, the second processor being configured to compute the first fraction by subtracting one minus the second fraction and adjusting the first beam in an amount equal to the first fraction multiplied by the error measured.

Guo discloses a system wherein when a second fraction is received, the second processor being configured to compute the first fraction by subtracting one minus the second fraction and

adjusting the first beam in an amount equal to the first fraction multiplied by the error measured (see col. 11, lines 61-67).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both teachings to arrive at the claimed invention. A motivation to do so would have been to arrive at an accurate adaptive transmit beam forming based on the result of an adaptive receive beam forming as related to the error measurement.

Regarding claim 30, The WTRU of claim 29 wherein the wireless entity with which the WTRU is communicating is another WTRU (see fig. 1, page 4, paragraph 46).

Regarding claim 31, WTRU of claim 29 wherein the wireless entity with which the WTRU is communicating is a base station (see fig. 1, page 4, paragraph 46).

Regarding claim 32, Etkin discloses a WTRU as described in claim 27, wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

9. Claims 1-11, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etkin and Guo et al. (Guo), U.S. Patent No. 6894643, in further view of Raleigh et al. (Raleigh), U.S. Patent No. 6665545.

Regarding claim 1, Etkin discloses a method for coordinating the use of beam forming between two communicating entities (see fig.1, page 4, paragraph 46) wherein control information regarding the use of beam forming is not communicated between the two entities (i.e., base station is configured to perform time-varying beamforming operations through the use of one or more antenna arrays. In paragraph 49, Etkin also discloses that as the base station

transmits signals (**beamformed** or otherwise), each of the mobile station within the sector receives the signal and computes a SINR. Thus, control information regarding the use of beam forming is not communicated between the entities if the signals transmitted by the base station are beamformed signals) (see fig. 1, page 4, paragraph 47), the method comprising the steps of: selecting one of the two communicating entities for reduction of the amount in which the selected entity will adjust its beam in response to misalignment between beams emanating from the two entities (i.e. the base station is configured to perform beam forming operations through the use of one or more antenna arrays) (see fig. 1, page 4, paragraph 47); selecting at least one adjustment parameter for adjusting the beam of the selected entity (i.e. beam width) (see abstract, and page 2, paragraph 21); and adjusting the beam of the selected entity using the selected adjustment parameter (see page 4, paragraphs 44 and 47).

Although Etkin discloses a method as described, Etkin does not specifically disclose a method comprising the steps of measuring an error in the alignment of the beams emanating from the two communicating entities; adjusting the beam of the selected entity using the selected adjustment parameter in accordance with the measured error, whereby the beams emanating from the two communicating entities are aligned with respect to each other. In addition, Etkin does not specifically disclose a method comprising determining a correction factor based on the measured error.

However, Guo discloses a method comprising the steps of measuring an error in the alignment of the beams which are being emanated and adjusting the beam in accordance with the measured error (i.e., the output signal $y(t)$ of the beam former 50 is compared with a reference signal $d(t)$ using a subtraction element 44, and the resulting difference signal $e(t)$, representing

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the difference between the actual output signal of the beam former and the reference signal, is applied to the tracking unit 52 which uses that error signal to adjust the weights applied to the multipliers) (see col. 11, lines 61-67).

Raleigh discloses a method for coordinating the use of beam forming between two communicating entities (see abstract), **the transmit and the receive sections of the particular transceiver employed are calibrated. The calibration procedure and apparatus described herein corrects for differences wherein in the amplitude and phase match between the signal paths through the transceiver corresponding to each antenna element of the frequency channels.** This matching correction allows receive channel statistics collected for each of the frequency channel to be accurately used within the corresponding transmit channel (see col. 21, lines 32-48). Thus, one skilled in the art would unhesitatingly conceptualize a correction factor for the communication entities must first be inherently determined before the beam of the communication entities can be calibrated or adjusted.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both arts to arrive at the claimed invention. A motivation for doing so would have been to provide features related to good estimate of the optimum control information, which can be obtained from the relative phase delays between signals received by respective elements (col. 3, lines 8-12).

Regarding claim 2, Etkin discloses a method as described in claim 1 rejection, wherein the two communicating entities are a base station and a wireless transmit/receive unit (see fig. 1, page 4, paragraph 46).

Regarding claim 3, Etkin discloses a method as described in claim 1 rejection, wherein the two communicating entities are two WTRUs (see fig. 1, page 4, paragraph 46).

Regarding claim 4, Etkin discloses a method as described in claim 1 rejection, wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 5, Etkin discloses a method as described above (see claim 1 rejection).

Although Etkin discloses a method comprising the step of: repeating the adjusting step until the error measured is below a predetermined value (see page 2, paragraph 15, and page 5, paragraph 49), Etkin does not specifically disclose a method comprising the step of repeating the measuring step.

However, Guo discloses a method comprising repeating the step of measuring (i.e., error signal is used to adjust the W1-W4 applied to the multipliers 62 (1) to 62 (4)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both arts to arrive at the claimed invention. A motivation for doing so would have been to provide features related to good estimate of the optimum control information, which can be obtained from the relative phase delays between signals received by respective elements (col. 3, lines 8-12).

Regarding claim 6, Etkin discloses a method for coordinating the use of beam forming between two communicating entities (see fig.1, page 4, paragraph 46) wherein control information regarding the use of beam forming is communicated between the two entities ((i.e., base station is configured to perform time-varying beamforming operations through the use of one or more antenna arrays. In paragraph 49, Etkin also discloses that as the base station

transmits signals (**beamformed** or otherwise), each of the mobile station within the sector receives the signal and computes a SINR. Thus, control information regarding the use of beam forming is not communicated between the entities if the signals transmitted by the base station are beamformed signals) (see fig. 1, page 4, paragraph 47), the method comprising the steps of: selecting at least one adjustment parameter for a first of the two communicating entities (i.e. beam width) (see abstract, and page 2, paragraph 21); selecting at least one adjustment parameter for a second of the two communicating entities (i.e., power gain) (see page 2, paragraph 22).

Guo discloses a method comprising the step of measuring an error in the alignment of beams emanating from the two communicating entities and adjusting the beam of the two communicating entities in an amount equal to the measured error such that the two beams emanating from the two communicating entities are aligned with respect to each other (i.e., the output signal $y(t)$ of the beam former 50 is compared with a reference signal $d(t)$ using a subtraction element 44, and the resulting difference signal $e(t)$, representing the difference between the actual output signal of the beam former and the reference signal, is applied to the tracking unit 52 which uses that error signal to adjust the weights applied to the multipliers) (see col. 11, lines 61-67).

Although Etkin discloses a method as described above, the combination does not specifically disclose a method comprising the steps of identifying a first correction factor for the first entity; identifying a second correction factor for the second entity.

However, Raleigh discloses a method for coordinating the use of beam forming between two communicating entities (see abstract), the transmit and the receive sections of the particular

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transceiver employed are calibrated. The calibration procedure and apparatus described herein corrects for differences wherein in the amplitude and phase match between the signal paths through the transceiver corresponding to each antenna element of the frequency channels. This matching correction allows receive channel statistics collected for each of the frequency channel to be accurately used within the corresponding transmit channel (see col. 21, lines 32-48). Thus, one skilled in the art would unhesitatingly conceptualize a correction factor for the communication entities must first be inherently determined before the beam of the communication entities can be calibrated or adjusted.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both teachings to arrive at the claimed invention. A motivation to do so would have been to have an accurate adaptive transmit beam forming based on the result of an adaptive receive beam forming.

Regarding claim 7, Etkin discloses a method as described in claim 6 rejection, wherein the two communicating entities are a base station and a WTRU see fig. 1, page 4, paragraph 46).

Regarding claim 8, Etkin discloses a method as described in claim 6 rejection, wherein the two communicating entities are two WTRUs (see fig. 1, page 4, paragraph 46).

Regarding claim 9, the combination (Etkin and Guo) discloses a method as described above (see claim 6 rejection). Etkin also discloses a method in which if the number of mobile stations is less than $N_{sub,1}$, the beam forming is turned off (see page 7, paragraph 72). One skilled in the art would immediately conceptualize that the beam-forming turning off is the result of an error measurement being insignificant.

Although the combination discloses a method as described above, the combination does not specifically disclose a method wherein the correction factor of one entity is zero thereby causing said entity to refrain from adjusting its beam.

However, Raleigh discloses a method where matching correction allows receive channel statistics collected for each of the frequency channel to be accurately used within the corresponding transmit channel (see col. 21, lines 32-48).

Therefore, it would have been obvious to one of ordinary skilled in the art to combine the teachings of Etkin, as described, with the teachings of Raleigh to arrive at a method as described in the claimed invention. A motivation to do so would have been to arrive at an accurate adaptive transmit beam forming based on the result of an adaptive receive beam forming as related to the error measurement.

Regarding claim 10, Etkin discloses a method as described in claim 6 rejection, wherein the at least one adjustment parameter for the first entity is selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 11, Etkin discloses a method as described in claim 6 rejection, wherein the at least one adjustment parameter for the second entity is selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 19, Etkin discloses a method for coordinating the use of beam forming between two communicating entities wherein control information regarding the use of beam forming is communicated between the two entities (see Etkin fig.1, page 4, paragraph 46), the

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method comprising the steps of: selecting at least one adjustment parameter for each of the entities (see abstract, and page 2, paragraph 21).

Guo discloses a method comprising the step of measuring, at each entity, an error in the alignment of beams emanating from the communicating entities and adjusting the beams using adjustment parameters respective to the measured error (i.e., the output signal $y(t)$ of the beam former 50 is compared with a reference signal $d(t)$ using a subtraction element 44, and the resulting difference signal $e(t)$, representing the difference between the actual output signal of the beam former and the reference signal, is applied to the tracking unit 52 which uses that error signal to adjust the weights applied to the multipliers) (see col. 11, lines 61-67).

Although the combination discloses a method as described, the combination does not specifically disclose a method comprising the step of selecting a correction factor.

However, Raleigh discloses a method for coordinating the use of beam forming between two communicating entities (see abstract), transmit and receive sections of the particular transceiver employed are calibrated. The calibration procedure and apparatus described herein corrects for differences wherein in the amplitude and phase match between the signal paths through the transceiver corresponding to each antenna element of the frequency channels. This matching correction allows receive channel statistics collected for each of the frequency channel to be accurately used within the corresponding transmit channel (see col. 21, lines 32-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine both teachings to arrive at the claimed invention. A motivation to do so

would have been to have an accurate adaptive transmit beam forming based on the result of an adaptive receive beam forming.

Regarding claim 20, Etkin discloses a method wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 21, Etkin discloses a method wherein the at least one adjustment parameter is a plurality of adjustment parameters (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 22, Etkin discloses a method wherein the plurality of adjustment parameters are selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

8. Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etkin, Guo, and Raleigh in view of Kingsley et al. (Kingsley), U.S. Patent No. 6768454.

Regarding claim 12, the combination discloses (Etkin, Guo and Raleigh) a method for coordinating the use of beam forming between two communicating entities (see Etkin fig.1, page 4, paragraph 46), the method comprising the steps of: selecting a first correction factor and a first adjustment parameter for each of the entities (refer to claim 6 rejection reasoning as related to Raleigh); selecting a second correction factor and a second adjustment parameter for each of the entities (refer to claim 6 reasoning as related to Raleigh); measuring an error in the alignment of beams emanating from the two communicating entities (see Guo col. 11, lines 61-67); adjusting the beam of both entities using the two first adjustment parameters according to both entities'

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respective first correction factors (Refer to claim 6 reasoning); and adjusting the beam of both entities using the two second adjustment parameters according to their respective second correction factors (refer to claim 6 reasoning). The combination further discloses the transmit and the receive sections of the particular transceiver employed are calibrated, wherein a matching correction allows receive channel statistics collected for each of the frequency channel to be accurately used within the corresponding transmit channel (see Raleigh col. 21, lines 32-48). Thus, one skilled in the art would unhesitatingly conceptualize a correction factor for the communication entities must first be inherently determined before the beam of the communication entities can be calibrated or adjusted. In addition, one skilled in the art would immediately envision with calibration procedure, and matching correction process, the sum of the correction factors as related to the receiver, transmitter must be equal to one.

Although the combination discloses a method as described above, the combination fails to specifically discloses the selection for the first and second correction factor, and the first and second adjustment parameter, the measurement of an error in the alignment of beams, and the adjustment of the beam as related to the use and functionality associated with both the azimuth and the elevation dimensions.

However, Kingsley discloses a method in which the elements of the array may be arranged in a substantially linear formation, and may be arranged side by side so as to provide azimuth beam steering or one on top of the other so as to provide elevation as well as azimuth beam steering (see col. 3, lines 55-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Etkin and Raleigh with Kingsley's to arrive at the

claimed invention. A motivation for doing so would have been to form an array having maximum or at least improved element gain for a given array factor direction (col. 3, lines 50-54).

Regarding claim 13, Etkin discloses a method as related to claim 12 rejection, wherein the two first adjustment parameters are selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 14, Etkin discloses a method as described in claim 13, wherein the two first adjustment parameters are the same for both entities (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 15, Etkin discloses a method as described in claim 13 rejection, wherein the two first adjustment parameters are different for both entities (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 16, Etkin discloses a method as described to claim 12 rejection, wherein the two second adjustment parameters are selected from the group consisting of boresight orientation, beam width, and power gain (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 17, Etkin discloses a method as described to claim 16 rejection, wherein the two second adjustment parameters are the same for both entities (see page 2, paragraph 14, and page 3, paragraph 22).

Regarding claim 18, Etkin discloses a method as described in claim 16 rejection, wherein the two second adjustment parameters are different for both entities (see page 2, paragraph 14, and page 3, paragraph 22).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pierre-Louis Desir whose telephone number is (571) 272-7799. The examiner can normally be reached on Monday-Friday 8:00AM- 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on (571) 272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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09/17/2006



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